Toxoplasmosis

Section 1: ABOUT THE DISEASE

A. Etiologic Agent

Toxoplasmosis is caused by *Toxoplasma gondii*, an intracellular protozoan parasite.

B. Clinical Description

Most people who acquire toxoplasmosis have no symptoms at all, but some people experience flu-like symptoms, swollen lymph glands, or muscle aches and pains that may last from a few days to several weeks. Symptoms may resemble mononucleosis, including fever, sore throat, and myalgia. However, in immunocompromised individuals, especially people with HIV/AIDS infection, toxoplasmosis may involve the brain (e.g., encephalitis), and less commonly, the lungs, heart, eyes, or other organs. It may also result in death in immunocompromised individuals. Infection during pregnancy (especially early in pregnancy) may result in congenital toxoplasmosis, and possibly, fetal death. Affected infants may demonstrate a variety of serious clinical problems at birth, including nervous system involvement, eye infection, and other generalized disease. Toxoplasmosis may reactivate in individuals with past infection who become immunocompromised. Congenital infection may present years after birth with decreased vision due to eye involvement. Treatment is not routinely indicated in healthy, immunocompetent persons.

C. Vectors and Reservoirs

Cats (and members of the cat family) are the definitive hosts of *T. gondii*. They acquire the parasite from eating infected rodents or other infected meat. Other animals (notably rodents, sheep, goats, pigs, cows, and birds) may be intermediate hosts and may carry the infective cysts in their tissue for a long period of time.

D. Modes of Transmission

People become infected with *T. gondii* by accidentally eating oocysts (mature eggs) from dirt, sandboxes, or other places where cat feces may be found, or by eating undercooked meat from infected animals. Transplacental (congenital) transmission results from primary maternal infection during pregnancy. Outbreaks have been associated with unpasteurized milk and undercooked meat.

E. Incubation Period

The incubation period for toxoplasmosis is usually from 5–20 days when associated with cats; one outbreak from eating undercooked meat was associated with an incubation period of 10–23 days.

F. Period of Communicability or Infectious Period

Except for *in utero* transmission, *T. gondii* is not transmitted directly from person to person. Oocysts shed by cats become infective from 1–5 days later and can remain infective in moist soil or water for over a year. Additionally, oocysts can remain infective in the meat of an infected animal until it is thoroughly cooked.

G. Epidemiology

T. gondii is found throughout the world. Cats become infected when they eat infected rodents or other infected meat or when exposed to contaminated feces from other cats, and infection involves the gastrointestinal tract. Humans can become infected when they eat under-cooked, contaminated meat or when they accidentally eat mature eggs in contaminated soil or food. Infection in humans and mammals—other than cats—can involve any tissue. Most congenital cases occur as a result of primary infection during early pregnancy (often asymptomatic for the mother). Infection in humans is common.

H. Bioterrorist Potential

This pathogen is not considered to be of risk for use in bioterrorism.

Section 2: REPORTING CRITERIA AND LABORATORY TESTING

A. What to Report to the Massachusetts Department of Public Health (MDPH)

Acute Toxoplasmosis: Case Classification

Confirmed

A case with clinical symptoms and laboratory confirmation of one of the following:

- Immunoglobulin M (IgM) antibody directed against *T. gondii*;
- Immunoglobulin A (IgA) antibody directed against *T. gondii*; or
- A four-fold rise in anti-*Toxoplasma* immunoglobulin G (IgG).

Probable

A case without clinical symptoms and with laboratory confirmation of one of the following:

- IgM antibody directed against *T. gondii*;
- IgA antibody directed against *T. gondii*;
- A four-fold rise in anti-*Toxoplasma* IgG;
- Isolation of *Toxoplasma* from blood or fluids;
- Demonstration of tachyzoites in histologic sections of tissues or in cytologic preparations; or
- Evidence of brain imaging (computed tomography or magnetic resonance imaging [MRI]) on a mass lesion with radiographic enhancement by contrast medium and evidence of both clinical and radiographic improvement after institution of anti-*Toxoplasma* therapy in an immunocompromised person.

Congenital Toxoplasmosis: Case Classification

Confirmed

A case with clinical symptoms and laboratory confirmation of one of the following:

- Isolation of *Toxoplamsa* or histologic evidence of the parasite in the newborn or infant; or
- A newborn or infant with a positive anti-*Toxoplasma* IgG antibody titer that persists beyond 12 months of life.

OR a newborn or infant with clinical symptoms AND

- A mother with confirmed infection during pregnancy; or
- A mother with histologic evidence of the parasite (tachyzoites or PCR+ for *T. gondii* genetic material) or positive PCR in amniotic fluid.

Probable

A newborn or infant with clinical signs and/or symptoms (diagnosed by CT/MRI and/or ophthalmoscopy) whose mother had laboratory confirmation, during pregnancy or delivery, of one of the following:

- IgM antibody directed against *T. gondii*;
- IgA antibody directed against *T. gondii*; or
- A four-fold rise in anti-*Toxoplasma* IgG.

Details relevant to the clinical history of the case will help classify whether a case is confirmed or probable. Please refer to *Additional Information* section for clinical descriptions of acute and congenital toxoplasmosis.

Note: See Section 3C for information on how to report a case.

B. Laboratory Testing Services Available

The MDPH State Laboratory Institute (SLI) provides serologic testing only for newborns as part of the Newborn Screening Program. The SLI does not currently provide routine diagnostic testing on other clinical samples.

Section 3:
REPORTING RESPONSIBILITIES AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To help identify the source of infection, and to prevent further transmission.
- To help identify and control outbreaks.

B. Laboratory and Health Care Provider Reporting Requirements

Toxoplasmosis is reportable to the local board of health (LBOH). The MDPH requests that health care providers immediately report to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of toxoplasmosis, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of *T. gondii* infection shall report such evidence of infection directly to the MDPH within 24 hours.

C. Local Board of Health (LBOH) Reporting and Follow-up Responsibilities

Reporting Requirements

MDPH regulations *(105 CMR 300.000)* stipulate that toxoplasmosis is reportable to the LBOH and that each LBOH must report any confirmed case of toxoplasmosis or suspect case of toxoplasmosis, as defined by the reporting criteria in Section 2A. Cases should be reported to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS) using a MDPH *Toxoplasmosis Case Report Form* (found at the end of this chapter). Refer to the *Local Board of Health Timeline* at the end of this manual's *Introduction* section for information on prioritization and timeliness requirements of reporting and case investigation.

Case Investigation

1. It is the responsibility of the LBOH to complete a MDPH *Toxoplasmosis Case Report Form* (found at the end of this chapter) by interviewing the case and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the case's health care provider or from the medical record.
2. Use the following guidelines to assist in completing the form:
    a. Accurately record the demographic information, health care provider information, and whether hospitalized (including location and associated dates). If the case is a congenital case, record the information listed above for the mother.
    b. Complete the clinical information for the case (or mother for congenital cases). Include date of onset, type(s) and duration of symptoms, and treatment(s) received.
    c. Ask other medical questions about immune and/or pregnancy status to further determine the source and/or risk of infection.
    d. Complete the "Diagnostic Laboratory Tests" section.
    e. Ask about the exposure history of the case (or mother, if congenital). Use the incubation period range for toxoplasmosis (5–20 days). Specifically, focus on the period beginning a minimum of 5 days prior to the case's onset date back to no more than 20 days before onset for the following exposures:
        i. Raw/undercooked meats: Determine the type(s) of meat and date(s) consumed by the case.
        ii. Travel history: Determine the date(s) and geographic area(s) traveled to by the case.
        iii. Soil/gardening: Determine the date(s) and geographic area(s) of exposures to soil/gardening.
        iv. Cats: Determine if there is a history of exposure to cats, cat litter, cat feces, etc.
        v. Other animals/pets.
        vi. Occupation (e.g., farmer, pet store worker) or activities (hobbies like gardening or landscaping): Determine exposure risks through potential contact with animals or through contaminated soil.
    f. If you have made several attempts to obtain case information but have been unsuccessful (e.g., the case or health care provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as you have gathered. Please note on the form the reason(s) why it could not be filled out completely.
3. After completing the form, attach laboratory report(s) and fax or mail (in an envelope marked "Confidential") to ISIS. The confidential fax number is (617) 983-6813. Call ISIS at (617) 983-6801 to confirm receipt of your fax. The mailing address is:

MDPH, Office of Integrated Surveillance and Informatics Services (ISIS)
305 South Street, 5th Floor
Jamaica Plain, MA 02130
Fax: (617) 983-6813

4. Institution of disease control measures is an integral part of case investigation. It is the responsibility of the LBOH to understand, and if necessary, institute the control guidelines listed in Section 4.

Section 4: CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements *(150 CMR 300.200)*

None.

B. Protection of Contacts of a Case

In congenital cases, draw antibody titers in the mother; in acute cases, antibody titers may be drawn on household contacts to assess a source of common exposure.

C. Managing Special Situations

Reported Incidence Is Higher Than Usual/Outbreak Suspected

If the number of reported cases of toxoplasmosis in your city/town is higher than usual or if you suspect an outbreak, investigate to determine the source of infection and the mode of transmission. A common vehicle (e.g., contaminated food, soil, or cat litter) should be sought, and applicable preventive or control measures should be instituted. Consult with the epidemiologist on-call at the MDPH Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases across town lines, which would otherwise be difficult to identify at a local level.

Note: Refer to the MDPH's Foodborne Illness Investigation and Control Reference Manual for comprehensive information on investigating foodborne illness complaints and outbreaks. Copies of this manual have been made available to LBOH. It can also be located on the MDPH website in PDF format at www.mass.gov/dph/fpp/refman.htm. For the most recent changes to the Massachusetts Food Code, contact the FPP at (617) 983-6712 or through the MDPH website at www.mass.gov/dph/fpp.

D. Preventive Measures

To prevent future exposures, pregnant women should:

- Always thoroughly cook meats before eating. Freezing meat reduces the infectivity level but does not eliminate it.
- Not clean cat litter boxes or pans.
- Always wear gloves during gardening or other contact with soil, wash hands immediately after contact, and always wash hands thoroughly before eating.

All individuals should:

- Feed cats produced cat food (dry or canned), and prevent them from hunting.
- Clean up cat litter boxes or cat feces daily. Handle and dispose of cat feces carefully.
- Always wash hands before eating, after handling cat or other animal feces, after handling uncooked meat, or after touching soil that might have cat feces in it.
- Cover children's sandboxes/sand piles to keep animals from defecating in play areas.
- Consider being tested for *Toxoplasma* if planning pregnancy (pre-existing infection in mothers is rarely, if ever, associated with congenital toxoplasmosis).

ADDITIONAL INFORMATION

There is no formal Centers for Disease Control and Prevention (CDC) surveillance case definition for toxoplasmosis. For reporting to the MDPH, always use the criteria outlined in Section 2A. In order to accurately classify confirmed and probable cases of acute and congenital toxoplasmosis, laboratory results and the clinical description of the case will be taken into consideration. See clinical descriptions below for more information.

Clinical Description

Acute Toxoplasmosis	Acquired infection is usually asymptomatic, but when symptoms develop, they may include lymphadenopathy (usually cervical), fever, sore throat, and myalgia. Severe manifestations may involve the brain (i.e., encephalitis), and less commonly, the lung (pneumonitis), the heart (myocarditis), the eye (chorioretinitis), or other organs.
Congenital Toxoplasmosis	An infection in newborns which is transmitted across the placenta during gestation. Maternal infection is almost always a primary infection and is often asymptomatic. Classical signs in newborns or infants include: chorioretinitis, hydrocephalus, and intracranial calcifications. The clinical spectrum may vary from normal appearance at birth to central nervous system involvement or symptoms of generalized disease (hepatosplenomegaly, lymphadenopathy, thrombocytopenia, jaundice, and anemia).

REFERENCES

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MDPH. *Foodborne Illness Investigation and Control Reference Manual*. Massachusetts Department of Public Health. 1997. <www.mass.gov/dph/fpp/refman.htm>.

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FORMS & WORKSHEETS

Toxoplasmosis

Toxoplasmosis

LBOH Action Steps

This form does not need to be submitted to MDPH with the case report form. It is for LBOH use and is meant as a quick-reference guide to toxoplasmosis case investigation activities.

LBOH staff should follow these steps when toxoplasmosis is suspected or confirmed in the community. For more detailed information, including disease epidemiology, reporting, case investigation, and follow-up, refer to the preceding chapter.

- ❑ Notify the MDPH Division of Epidemiology and Immunization, at (617) 983-6800 or (888) 658-2850, to report any confirmed or suspect case(s) of toxoplasmosis.
- ❑ Obtain laboratory confirmation.
- ❑ Fill out the case report form (attach laboratory results).
- ❑ Send the completed case report form (with laboratory results) to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS).